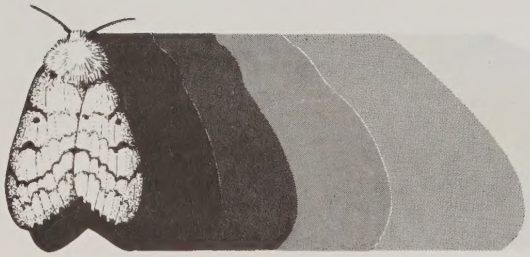
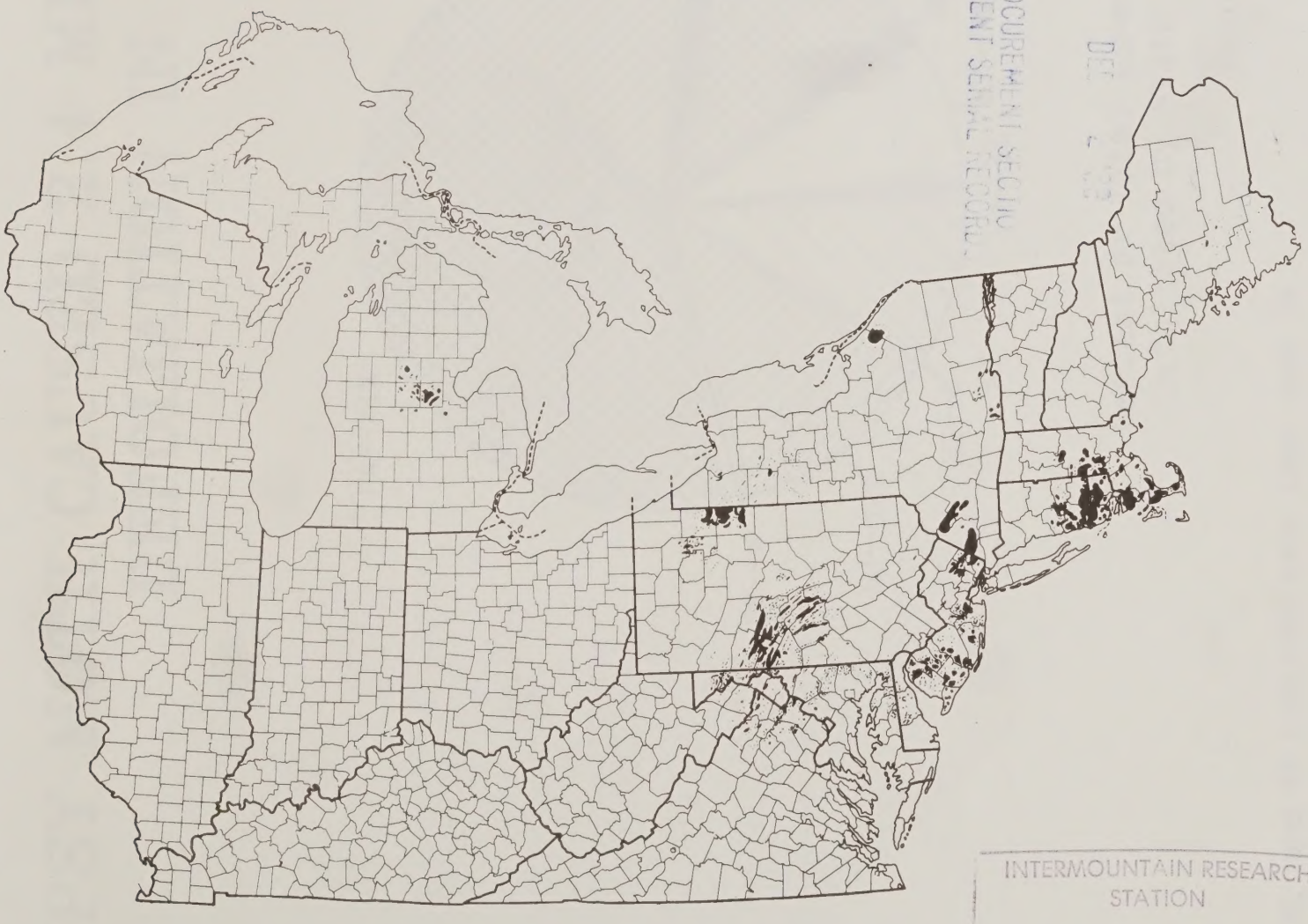


November 1986
Number 13

GYPSY MOTH NEWS

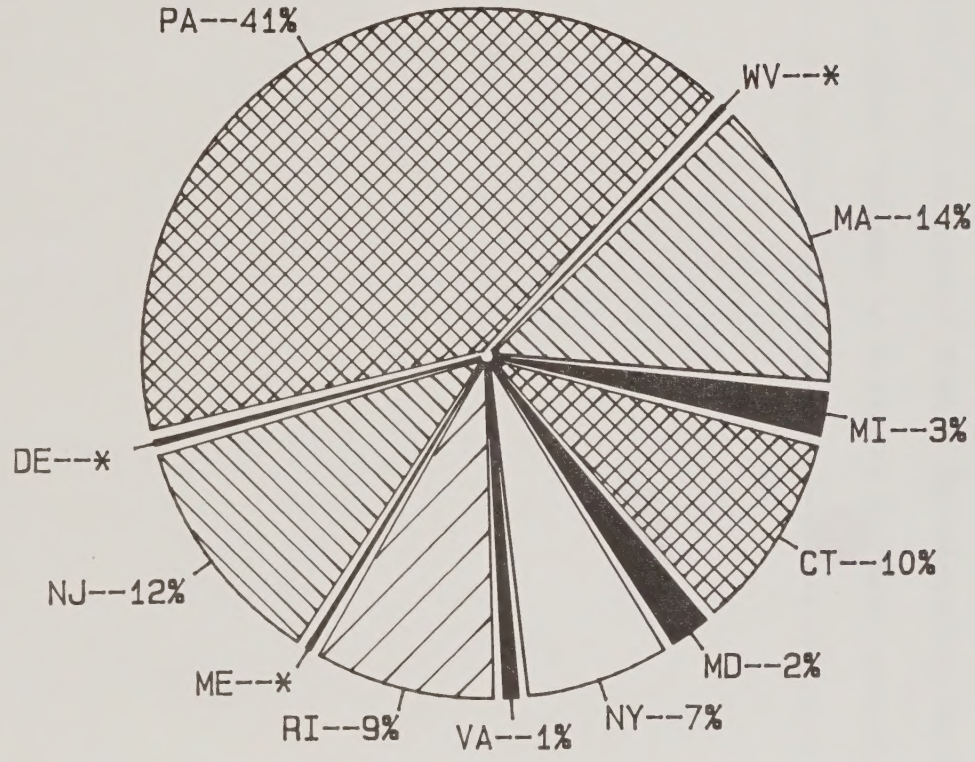
370 REED ROAD, BROOMALL, PA 19008
U.S.D.A., FOREST SERVICE

GYPSY MOTH CAUSED 2.4 MILLION ACRES OF DEFOLIATION IN 1986



Prepared by USDA Forest Service, Forest Pest Management, Morgantown, WV.

GYPSY MOTH CAUSED 2.4 MILLION ACRES OF DEFOLIATION IN 1986



Percent of Total Acres
Defoliated by State

	Acres
DE	3,118
WV	8,250
ME	11,572
VA	27,259
MD	58,190
MI	61,370
NY	175,365
RI	219,150
CT	237,237
NJ	280,290
MA	343,091
PA	987,819

Moderate to heavy defoliation.

* DE, ME, and WV combined have less than 1%.

Prepared by USDA Forest Service,
Forest Pest Management, Morgantown, WV

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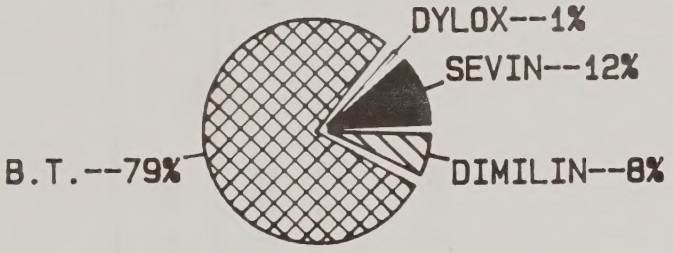
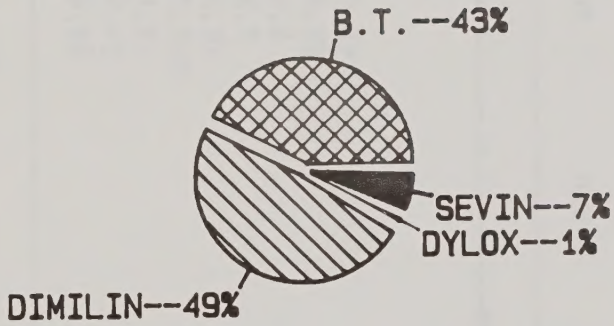
SUMMARY OF GYPSY MOTH SUPPRESSION PROJECTS - 1986

Ownership	Insecticide Used			
	B.t.	Dimilin	Sevin	Total
	Acres			
State Cooperative				
Delaware	42,028	16,565		58,593
Maryland	15,253	74,373		89,626
Massachusetts	3,909			3,909
Michigan	7,550			7,550
New Jersey	68,789	1,303		70,092
Pennsylvania	56,600	145,542		202,142
Rhode Island	18,107			18,107
Virginia	3,709	27,920		31,629
West Virginia	700	82,710		83,410
Total	216,645	348,413		565,058
Federal Lands				
Letterkenny Army Depot		1,450		1,450
Raystown Lake Army Corp of Engineers		1,129		1,129
Tionesta Lake Army Corp of Engineers	130			130
Seneca Indian Reservation			7,855	7,855
West Point Dept. of Defense	2,548			2,548
Total	2,678	2,579	7,855	13,112
Grand Total	219,323	350,992	7,855	578,170

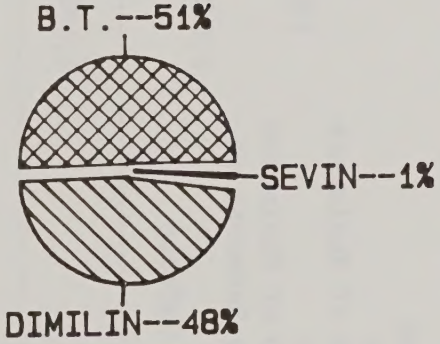
SUMMARY OF INSECTICIDE USE IN GYPSY MOTH SUPPRESSION PROJECTS



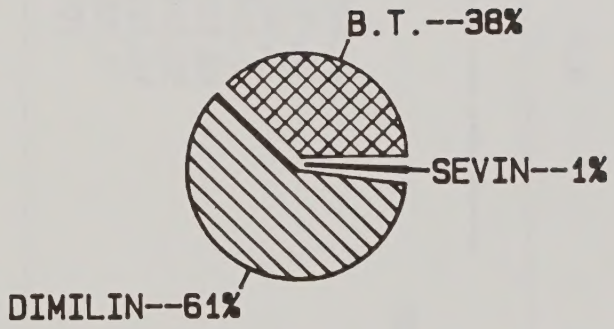
1983
598,760 AC



1984
512,205 AC



1985
511,127 AC



1986
578,170 AC

Treated acres in DE, MD, MA, MI, NJ, PA, RI, VA, and WV.
prepared by USDA Forest Serv., Forest Pest Mgt.

ERADICATION TREATMENTS - 1986

State	Approximate Acreage	Treatment (Number of Applications)
Illinois		
Peoria/Peoria Co.	128	Mass trapping
Geneva/Kane Co.	25	Mass trapping
Lake Forest/Lake Co.	80	Mass trapping
Subtotal	233	
Indiana		
Kosciusko Co.	150	Mass trapping
Ft. Wayne	40	Mass trapping
Elkhart County	41	Mass trapping
Subtotal	231	
Kentucky		
Jefferson Co. (Anchorage)	500	Mass trapping
Minnesota		
Apple Valley (N)	145	B.t. (3)
	216	Mass Trapping
Apple Valley (S)	135	B.t. (3)
	240	Mass Trapping
Lakeville	58	Mass Trapping
Moundsview	12	Mass Trapping
Subtotal	806	
North Carolina		
Carteret Co.	3	Orthene (1), MT
Currituck Co.	9	B.t. (2), Orthene (1), MT
Dare Co.	288	Sterile Insects
Davidson Co.	1	Sevin (1), MT
Guilford Co.	1/2 Block	B.t. (2), MT
Halifax Co.	4	B.t. (2), MT
Northampton Co.	5	B.t. (3), MT
Washington Co.	9	B.t. (4), Sevin (1), MT
Subtotal	319	
Ohio		
Gurne/Wayne Co.	100	Sevin (2)
Darke Co.	10	Sterile Insects
Astabula Co./ Andover	260	Dimilin

ERADICATION TREATMENTS - 1986 - continued

State	Approximate Acreage	Treatment (Number of Applications)
Dorset	1,100	Dimilin
Hartsgrove	990	Dimilin
Rockcreek	740	Dimilin
Morgan Co.	4,910	Dimilin
Subtotal	8,110	
Oregon		
Clackamas Co./ Lake Oswego	60	Mass Trapping
Douglas Co./Glide	4,891	B.t. (4)
Lane Co.	189,011	B.t. (3)
Multnomak Co./ E. Portland--111th & Yam Hill	75	Sterile Insects
E. Portland--115th & Powell	120	Mass Trapping
Marion Co.	20	Mass Trapping
Stagton/Salem-Filbert Orchard	16	B.t. (5), Mass Trapping, Cut down trees for firewood & treated with Methylbromide
Summit Loop	10	Mass Trapping
Subtotal	194,203	
Washington		
Manor/Clark Co.	30	Sterile Insects
Greenwood/King Co.	61	Mass Trapping
Lynnwood Center/Kitsap Co. (Bainbridge Island)	102	Mass Trapping
Pierce Co.	46	Mass Trapping
Bellingham/Whatcom Co.	100	Sterile Insects
Subtotal	339	
Virginia		
Albermarle Co.	1	Dimilin
Botetourt Co.	10	Mass Trapping
Gloucester Co.	4	B.t.
Hampton (IC)	2	Dimilin
King George Co.	10	Dimilin
Middlesex Co.	1	Dimilin
Norfolk (IC)	11	Dimilin
	2	Dimilin
	1	Dimilin
	3	Dimilin
	2	Dimilin
	53	Dimilin (2)

ERADICATION TREATMENTS - 1986 - continued

State	Approximate Acreage	Treatment (Number of Applications)
Orange Co.	2	Dimilin
Virginia Beach (IC)	12	Dimilin
	2	B.t. (2)
	2	Dimilin
Washington Co.	100	Luretape
Subtotal	218	
Grand Total	204,959	

THE GYPSY MOTH IN MICHIGAN[1]

The gypsy moth infestation currently established in Michigan was discovered in 1972 in the central lower peninsula. An intensive trapping and eradication program began in 1973 with the cooperation of USDA, APHIS. The plan was to treat the west edge of the infestation and work eastward following the general wind pattern. Efforts persisted until 1978 when, with little public support, a court injunction curtailed treatment. Eradication treatment was resumed in 1979 but by late 1982 moth trap results clearly indicated a population too extensive for eradication success.

Acres Defoliated

County	1979	1980	1981	1982	1983	1984	1985	1986
Clare	0	0	0	0	0	0	0	2,040
Gratiot	1	3	18	7	0	0	30	400
Isabella	3	10	0	5	300	2,665	3,790	5,990
Midland	0	5	0	80	157	3,760	14,640	55,490
Montcalm	7	0	0	0	0	0	0	200
Saginaw	0	0	0	0	0	0	0	30
Total	11	18	18	92	457	6,425	18,460	64,150

Populations and acres defoliated continued to increase particularly between the cities of Mt. Pleasant (Isabella County) and Midland (Midland County). By 1985 gypsy moth became so intolerable, citizens initiated a petition drive to obtain State supported relief. The Michigan Department of Agriculture was charged with developing an action plan.

The resulting plan is a voluntary suppression plan combining funds from local, State and USDA Forest Service to provide an umbrella type protection in forested residential and recreational sites during periods of explosive build ups. Though this plan was not approved until late November 1985, a treatment program was implemented in 1986. Both Isabella and Midland Counties participated. Approximately 8,000 acres were treated by helicopter in Midland County and another 1,000 acres by fixed-wing in Isabella County. One application of B.t. at 16 B.I.U. was applied in both areas. The results of a post-treatment perception survey showed 81% of the respondants supporting this project.

Defoliation for 1986 continued to increase exceeding 64,000 acres, mainly in Midland County. A millage issue there was placed on the August ballot. It asked for 0.3 mil for 3 years to treat gypsy moth with B.t. The millage passed by a 6:1 margin and is expected to generate over $400,000 each year.

Populations north and south of this two-county area also continue to grow. One community northwest of Detroit funded its own treatment program this year. The next area likely to be hard hit is Clare County with a heavy oak-aspen mix. MDA, in concert with the Michigan Department of Natural Resources, USDA Forest Service, and various state universities, is developing a uniform long-range plan for addressing this pest. Our upper peninsula currently has no known infestation. An isolated one in the western portion was treated in 1984 and is considered eliminated. We will continue trapping and attempt to maintain it free of this moth.

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[1]Submitted by Ron Priest, Michigan Department of Agriculture, P. O. Box 30017, Ottawa Building, North, Lansing, MI 48909.

GYPSY MOTH ACTIVITIES - 1986
NORTH CAROLINA DEPARTMENT OF AGRICULTURE[1]

Well localized spot infestations of gypsy moth were treated in seven locations in 1986. These included an urban site, a coastal suburban development, a veneer lumber mill and four rural sites. The infested areas all appeared to be less than five acres in extent. The coastal infestation was experimentally treated by the APHIS Gypsy Moth Methods Development Lab with F1 sterile gypsy moths.

Results of our adult trapping efforts are currently being processed and egg mass surveys will begin in November. A total of 15,500 delta traps were deployed throughout the accessible areas of the State in at least a one trap per four square mile rate. Preliminary estimates indicate that less than 30 sites will be surveyed for egg masses compared with slightly over 50 in 1985. More evidence is accumulating that suggests that the large number of male moths caught in previous years on our coastal plain were predominantly blown from epidemic populations in more northern states.

No moths were caught in the counties adjacent to the 1984 and 1985 treatment location on our border with Tennessee.

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[1]Submitted by Karen G. Wilson, Staff Entomologist, North Carolina Department of Agriculture, P. O. Box 27647, Raleigh, NC 27611.

SILVICULTURAL GUIDELINES FOR FOREST STANDS THREATENED BY THE GYPSY MOTH[1] [2]

Introduction

Silvicultural treatments that may minimize gypsy moth impacts on hardwood stands are being recommended based on ecological and silvicultural information. You can reduce stand susceptibility and vulnerability by increasing stand vigor, removing trees most likely to die, reducing gypsy moth habitat, reducing preferred gypsy moth food sources, improving predator and parasite habitats, and regenerating stands that are close to maturity or understocked. Regeneration cuttings before defoliation preserve seed production, established advanced regeneration, and stump sprouting potential. Outbreak prescriptions prioritize stands for possible insect population control actions and regenerate stands that are close to maturity or understocked. Postoutbreak prescriptions center on efficient salvage of dead trees and the regeneration of stands that are either understocked due to excessive mortality or are close to maturity. While these guidelines have not been tested, they represent the current knowledge of the impacts of gypsy moth defoliation on forest stands.

The use of these guidelines requires a stand examination, analysis of stand and insect characteristics, determination of the proper prescription using decision charts, and implementation of the prescription. The guidelines have been developed based on literature review of pertinent research and incorporation of this information into guidelines. A summary of the guidelines is provided below, however, interested persons should contact the author for a more complete description.

Summary of Guidelines

Appropriate intermediate stand treatment prescriptions are determined by the proximity of infestation and when defoliation may be expected, coupled with stand characteristics and economic maturity. If the stand is not under immediate threat and defoliation is not expected within the next 5 years, there is adequate lead time in which to take preventive action. Seven silvicultural prescriptions have been described that may aid in reducing timber losses under these conditions. If the stand is poorly stocked (less than C-level; 35 percent) or if the stand is adequately stocked (C-level or better; 35 percent) but is within 5 years of maturity, you may wish to consider stand regeneration. Shortening the stand cycle will allow you to market the current stand, avoid lost value in the sale of dead salvage material, and assure adequate regeneration through seed production and stump spouting from the living trees. If advanced regeneration stocking and stump sprouting potentials are adequate, you can regenerate the stand with a presalvage harvest. For stands where these sources of regeneration are not adequate, then a presalvage shelterwood or sanitation conversion may be

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[1] Summary of a longer USDA Forest Service General Technical Report that is currently in press and will be available soon.

[2] Submitted by Kurt W. Gottschalk, Research Forester, Northeastern Forest Experiment Station, USDA Forest Service, 180 Canfield St., P.O. Box 4360, Morgantown, WV 26505.

considered. If the stand is highly vulnerable and susceptible, then a conversion to nonpreferred species will help prevent the spread and establishment of gypsy moths. On lower quality sites, conversion will usually be to a pine species; higher quality sites can be converted naturally to mixed hardwoods using shelterwood or selection cutting. When stand susceptibility and vulnerability are low, then presalvage shelterwood cutting can develop adequate advanced regeneration but without requiring drastic change in composition.

If the stand is fully stocked but will not reach maturity for another 6 to 15 years, it is advisable to defer cutting for 6 to 15 years, or re-examine for possible protection, early harvest, or salvage after mortality has occurred. Fully stocked stands that may be 16 or more years from maturity and with less than 80 percent stand density may best be handled by deferred cutting for 10 to 15 years or re-examining status as defoliation becomes an immediate threat. Experience has shown that the stresses created by thinning or cutting remain for 3 to 5 years after treatment. Reduced vigor resulting from this stress, coupled with gypsy moth-caused defoliation stress, may yield much higher mortality losses. Thus, these higher value, highly stressed stands should be closely observed and possibly sprayed with insecticides if an outbreak is expected during the recovery period. For fully stocked stands that are 16 or more years from maturity and have greater than 80 percent stand density, sanitation thinning or presalvage thinning may be considered, depending upon the percentage of the basal area that is in preferred food species. Sanitation thinning is designed to prevent the spread and establishment of damaging organisms, to reduce stand susceptibility by removing preferred food species and refuges for the gypsy moth, and promote predator and parasite habitat. The treatment is best applied in stands where less than 50 percent of the stand basal area is in preferred food species, and where other management objectives will allow. Presalvage thinning reduces defoliation-caused losses by removing the most vulnerable trees before they are defoliated and killed. The major objective is to reduce stand vulnerability by early removal of those trees that are most likely to die. Presalvage thinning is best suited for those stand conditions described above, but in which more than 50 percent of the basal area is in preferred food species. The most vulnerable trees are poor crown oaks, poor crown other species, and fair crowned trees, particularly on poorer, drier sites. Good crowned trees are least likely to die.

If defoliation is currently taking place or expected within the next 5 years, the most appropriate action is to protect through insecticide application, to closely monitor and evaluate current conditions through stand examinations, or to move ahead with stand regeneration plans as described above. Stand priorities for insecticide application may be based on stand maturity, condition, and value of the stand; the severity of the gypsy moth threat; and planned management objectives. Under certain conditions of low stand value or low risk, the best course of action may be to delay direct treatment and to re-examine the stand after defoliation to assess current condition, extent of damage, and salvage potential.

If defoliation has recently occurred, wait 1 to 3 years to allow any mortality that may result to occur. At that time, the stand can be re-evaluated to consider stand regeneration if damage levels are high and current stocking levels are poor, or stand maturity is within 10 years. Salvage harvest can be used when regeneration stocking is adequate. When it is not adequate, then

salvage shelterwood or salvage conversion can be used to obtain adequate regeneration or convert the stand to nonpreferred species as in the presalvage prescriptions. If damage levels are low to moderate, current stocking levels are adequate to maintain the stand, and the stand is more than 10 years from maturity then several intermediate treatments are possible. Salvage thinning is used to salvage dead trees and thin live trees that are present until the stand reaches the proper residual stand density (B-level stocking). If the stocking of live trees is between B- and C-level and there is at least 30 percent mortality, then a salvage cutting is called for. Otherwise, stands with the same stocking levels but less than 30 percent mortality should have deferment of further cutting until they increase in stocking.

Dead trees may be utilized for sawtimber if cut within 1 to 3 years of death. Increasing time after death will decrease the stumpage value, the quality of the lumber, and increase drying problems and checks. Veneer trees generally are downgraded to sawtimber status when they die. Trees dead up to 5 years are useable for pulpwood with no loss in quality or yield if bought by weight because the increased volume per ton of the dead trees offsets the increased fines and decay losses.

Conclusions

While these guidelines have not been tested, they represent the current knowledge of the impacts of gypsy moth defoliation on forest stands. Opportunities exist to manage forests in areas where the gypsy moth is or will be present in an economical manner without sacrificing management objectives or allowing the insect to dominate management actions as has happened in many areas of Pennsylvania, New York, and other infested areas. Eventually the forest, forest managers, and this exotic insect pest may approach a state of tolerable coexistance.

DEVELOPING SILVICULTURAL OPTIONS TO MITIGATE THE MOTH[1]

It has become apparent that repeated defoliations by gypsy moth in many stands in the northeast will force land managers to re-evaluate silvicultural techniques applied in susceptible areas. To reduce future susceptibility to defoliation and vulnerability to mortality, the timing of silvicultural activities must be adjusted to the cycles of the gypsy moth. In many cases, it may be necessary to modify stand prescriptions.

In 1983, the USDA-Forest Service, Northeastern Forest Experiment Station, formed Research Work Unit 4507 to identify silvicultural options for coping with the gypsy moth. In 1986, this unit developed preliminary guidelines for making silvicultural prescriptions that consider the impact gypsy moth may have on individual stands (see article by Dr. Gottschalk in this issue).

In 1986, the West Virginia Division of Forestry, as a special project, began establishment of demonstration areas to display the application of silvicultural techniques for coping with the gypsy moth. This effort has been implemented with cooperation and technical assistance from the USDA-Forest Service (Northeastern Area State & Private Forestry, and Northeastern Forest Experiment Station) in Morgantown, West Virginia. Funding for the project was obtained through the Northeastern Area's Focusing Federal Assistance program, a recent initiative that provides funds for new innovative projects. The first demonstration area has already been visited by foresters from the State of Maryland. When additional sites are completed, they will exhibit various prescriptions from the guidelines developed by Kurt Gottschalk.

Application of the gypsy moth guidelines is being facilitated by SILVAH, a computer program developed by the Northeastern Forest Experiment Station in Warren, Pennsylvania. SILVAH (SILViculture of Allegheny Hardwoods) provides a stand prescription based on data collected from an inventory of the overstory, combined with a regeneration and stand condition survey. The current microcomputer version, 2.3, was utilized for the first time in West Virginia in 1986. Although SILVAH V2.3 has been useful, its utility in areas impacted by gypsy moth could be improved with a program option incorporating the gypsy moth guidelines in the stand prescriptions it produces.

A new version of SILVAH, 3.01, is currently being developed that will include several enhancements. Among them will be an option which incorporates the gypsy moth guidelines in stand prescriptions. When version 3.01 is completed, it will be promoted as a tool to facilitate adoption of the gypsy moth guidelines in states that are, or will be, impacted by the insect. Continuation of this cooperative effort should result in products that will be useful to many practicing foresters.

---

[1]Submitted by Arlyn W. Perkey, Northeastern Area State and Private Forestry, and Kurt W. Gottschalk, Northeastern Forest Experiment Station, USDA Forest Service, P.O. Box 4360, Morgantown, WV 26505.

SPRAY DRIFT

Continuum Dynamics, Inc., has developed SWA+H, a personal computer-based software package designed to facilitate safer and more efficient use of agrichemicals by letting the user assess the potential of undesirable drift and compensate for it. SWA+H can assess drift potential for both aerial- and ground-applied agrichemicals prior to application.

Users need not have previous computer experience. A sequence of interactive menus walks the user through data entry of aircraft characteristics (such as flight speed, propulsion system, wing-span, aircraft weight, and altitude) and other factors such as atmospheric conditions, agricultural material properties, and nozzle and spreader locations. Using technology developed under NASA's Agricultural Aviation program, SWA+H analyzes the entered data and then models the turbulent flow behind the aircraft or ground sprayer, solves for the motion of materials released, and provides graphic summaries of the spray cloud and ground deposition. Depending on the output, the user can then adjust spray height, nozzle position, or other factors in order to achieve the desired swath width and application concentration while minimizing drift. SWA+H is compatible with IBM and IBM compatible personal computers.

Contact: Continuum Dynamics, Inc., P.O. Box 3073, Princeton, NJ 08543 (609)734-9282 or Richard Reardon, USDA Forest Service, 180 Canfield Street, Morgantown, WV 26505 (304)291-4133.

Editor's Note: This article appeared in the November issue of the Journal of Forestry.

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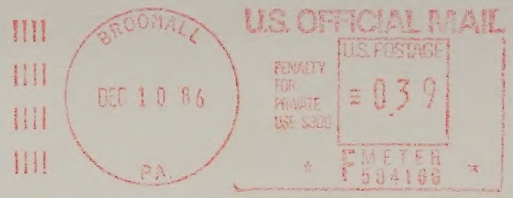

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